Project Introduction

To enhance aerodynamic design capabilities, Desktop Aeronautics proposes to combine a new sweep/taper integrated-boundary-layer (IBL) code that includes transition prediction with a Cartesian Euler solver developed at NASA. This combined solver will play an important role in the preliminary design of both conventional and unconventional aerospace vehicles traveling at subsonic, transonic, and supersonic speeds. Complex aircraft configurations may be easily analyzed with the practically automated surface intersection and Cartesian mesh generation of the Euler solver. The proposed design-oriented approach to transition prediction will permit rapid assessment of aircraft that exploit natural laminar flow to reduce drag. To facilitate design and numerical optimization using the new aerodynamic analysis, a parameterized geometry engine that can quickly model complex aircraft configurations will be interfaced with the Euler/IBL solver. Desktop Aeronautics will also develop a set of optimization tools well-suited to use with the geometry engine and aerodynamic analysis. This set of tools will permit aerodynamic shape optimization and multidisciplinary design at earlier stages in the vehicle development process.

Primary U.S. Work Locations and Key Partners

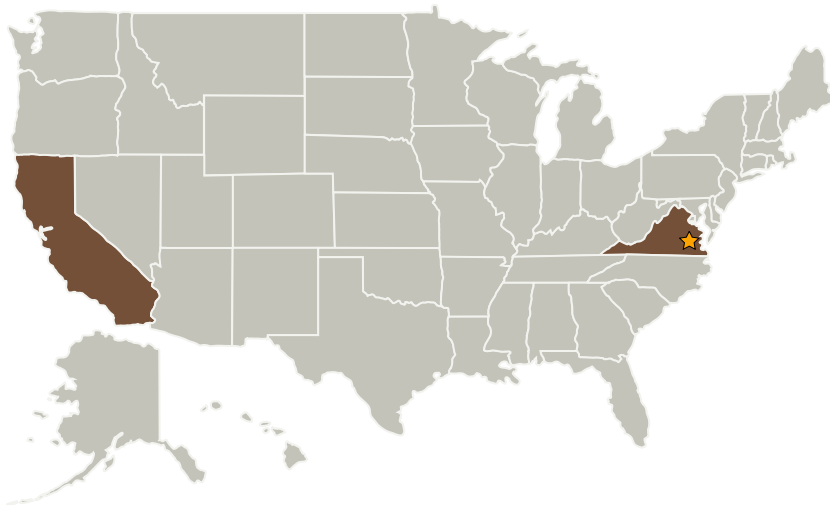High-Fidelity Aerodynamic Design with Transition Prediction, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Organizations Performing Work	Role	Type	Location
⭐Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Desktop Aeronautics, Inc.	Supporting Organization	Industry	Palo Alto, California

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  └ TX15.1 Aerosciences
     └ TX15.1.3 Aeroelasticity